K3851-R ATX
Industrial Series

Intel® R680E Chipset and
Intel® 12th Gen Core™ i3/i5/i7/i9 Processors

- Latest DDR5 memory technology for best-in-class system performance
- Intel® UHD Graphics 7xx driven by Xe Architecture
- Tripple LAN 1GbE/2.5GbE incl. Teaming and TSN support
- Dual M.2 Key-M SSD & single M.2 Key-E WLAN sockets onboard
- Powerful USB 3.2 Gen 2/Type-C, 4x COM, GPIO
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The Industrial Motherboard K3851-R ATX is equipped with the highly performant Intel®R680E Chipset. It also offers a multitude of supporting processors such as the Intel® Core™ i9/i7/i5/i3 (12th Gen) and the Intel® Pentium®/Intel® Celeron® processor series. Designed and approved for 24/7 continuous operation and an enhanced temperature range up to 60 °C the K3851-R ATX provides high functionality and fits perfect with special requirements of certain markets. It offers iAMT-based Out-of-Band Management features. Besides, K3851-R provides TSN and Realtime support (TCC) for specific industrial applications.

PRODUCT HIGHLIGHTS

- Intel® 12th Gen Core™ Processor Series
- DDR5-4800 UDIMM, max. 128 GByte, ECC support
- cTDP – Easy & flexible reduction of CPU TDP
- Supporting Intel® iAMT features and Intel® Time Coordinated Computing (TCC)
- PCI Express® x16 (Gen5 @ CPU, Gen4 @ PCH)
- 1x Intel® GbE LAN, 2x 2.5GbE incl. Teaming and TSN
- Intel® UHD Graphics 7xx driven by Xe Architecture; 4x DisplayPort V1.4a @4k
- Intel® High Definition 5.1 Audio; Intel® integrated TPM V2.0
- 8 Bit GPIO; 4 x COM ports
- 3x USB 3.2 Gen 2, 6x USB 3.2 Gen1, 2x USB 2.0, 1x USB 3.2 Gen2 stick socket, 1x USB 2.0 stick socket
- 4x SATA 6G incl. RAID support
- 2x M.2 22300/2242/2280 (Key-M, PCIe/NVME SSD modules), incl. NVME RAID support
- M.2 2230 (Key-E, WLAN/Bluetooth modules, incl. CNVi support)
- PCI Slot (32 Bit)
- BIOS-POST/-Boot & OS – HW Watchdog onboard

TECHNICAL INFORMATION

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>PROCESSOR</th>
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<tbody>
<tr>
<td></td>
<td>Intel® Core™ i9/i7/i5/i3 (12th Gen) processor series</td>
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<tr>
<td></td>
<td>Intel® Pentium®/Intel® Celeron® processor series</td>
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<tr>
<td></td>
<td>Socket LGA1700, max. 125 W TDP</td>
</tr>
<tr>
<td></td>
<td>(For details on supported processors please refer to Kontron FTP Server)</td>
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<tr>
<td></td>
<td>Intel® R680E Chipset</td>
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<tr>
<td></td>
<td>4 DIMM Sockets DDR5-4800, max. 128 GByte, Dual Channel unbuffered, ECC support</td>
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<tr>
<td></td>
<td>Effective memory speed of DDR5-4800 modules according Intel® specification: 1x DIMM per channel = max. DDR5-4400</td>
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<tr>
<td></td>
<td>2x DIMM per channel (single rank) = max. DDR5-4000</td>
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<tr>
<td></td>
<td>2x DIMM per channel (dual rank) = max. DDR5-3600</td>
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<table>
<thead>
<tr>
<th>VIDEO</th>
<th>GRAPHICS</th>
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<tbody>
<tr>
<td></td>
<td>Intel® UHD Graphics 7xx (depends on installed processor), 4x DPP V1.4a</td>
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<thead>
<tr>
<th>AUDIO</th>
<th>AUDIO CODEC</th>
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<tbody>
<tr>
<td></td>
<td>Tempo Semiconductor 92HD91B</td>
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<table>
<thead>
<tr>
<th>NETWORK CONNECTION</th>
<th>ETHERNET 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intel® i219LM with 10/100/1000 MBit/s, iAMT features, Wake-on-LAN (WoL) by interesting Packets, Link Status Change and Magic Packet™, PXE Support, BIOS MAC Address Display, Teamung Support</td>
</tr>
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<table>
<thead>
<tr>
<th>PERIPHERAL CONNECTION</th>
<th>USB</th>
</tr>
</thead>
<tbody>
<tr>
<td>2x USB 3.2 Gen 2 (rear I/O, Type-A), 1x USB 3.2 Gen 2 (rear I/O, Type-C with locking option), 4x USB 3.2 Gen1 (rear I/O, Type-A), 2x USB 3.2 Gen1 (by header), 2x USB 2.0 (by header), 1x USB 3.2 Gen2 (internal Type-A stick socket), 1x USB 2.0 (internal Type-A stick socket)</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>SERIAL PORT</th>
<th>OTHER I/Os</th>
</tr>
</thead>
<tbody>
<tr>
<td>1x RS232 (rear I/O), 3x RS232 (by header)</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>STORAGE &amp; EXPANSION</th>
<th>SATA M.2 PCIe/NVME</th>
</tr>
</thead>
<tbody>
<tr>
<td>4x Serial ATA III 600 Interface (up to 6GBit/s), NCQ, AHCI, RAID 0/1/5/10</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>M 2 WIRELESS</th>
<th>PCIE/PCI SLOTS</th>
</tr>
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<tbody>
<tr>
<td>1x M.2 22300 (Key-E, WLAN/Bluetooth modules, incl. CNVi support) PCI x16: 1x 16 lanes, Gen5x1 4 lanes, Gen4 PCI x8: 1x 8 lanes, Gen3 (“open slots”) PCI x4: 2x Gen3 (“open slots”) PCI: 1x 32Bit slot</td>
<td></td>
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<table>
<thead>
<tr>
<th>POWER</th>
<th>CONNECTOR INPUT VOLTAGE</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>ATX (Multirail) plus 8-pin socket (12 V for CPU)</td>
</tr>
</tbody>
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*) 5.1 support via SPDIF output
**) Requires HW Rev. v 02xx
## TECHNICAL INFORMATION

### FIRMWARE

BIOS

AMI Aptio 5.x (UEFI) BIOS modified and adapted by Kontron; Recovery BIOS, SM-BIOS (DMI), BIOS and CPU Microcode Update, Quick Boot, Logo Boot, Quiet Boot, Plug & Play, Automatic DRAM and PCIe Configuration, BIOS Support for S.M.A.R.T., Advanced Power Management, ACPI S3/S4, Wake on time from S5. HW Watchdog support

No legacy OS support, no MBR installation (UEFI only)

Recovery BIOS, System and BIOS Password, Boot Sequence Control

Integrated TPM V2.0 (Intel® integrated); socket for optional TPM module

### SYSTEM CONTROL

REAL TIME CLOCK

TPM

1x Header for Reset button, HDD LED & External Speaker, Power button, Power LED

Recovery BIOS, System and BIOS Password, Boot Sequence Control, Serial/USB- Port Access Protection, Write Protection for Flash BIOS, EraseDisk (BIOS Feature), Trusted Platform Module (TPM)

### SOFTWARE

OS SUPPORT

MS Windows 10, MS Windows 11, MS Windows 10 IOTG, MS Windows Server Linux-64

No legacy OS support, no MBR installation (UEFI only)

### MECHANICAL

DIMENSIONS (L x W)

ATX: 9.6" x 12" (243.8 x 304.8 mm)

ENVIRONMENTAL

OPERATION TEMPERATURE

0 °C - 60 °C

### CERTIFICATION

TECHNICAL INFORMATION

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No legacy OS support, no MBR installation (UEFI only)

Recovery BIOS, System and BIOS Password, Boot Sequence Control

Integrated TPM V2.0 (Intel® integrated); socket for optional TPM module

### POWER SUPPLY REQUIREMENTS

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>VOLTAGE</th>
<th>MIN. PS LOAD</th>
<th>MAX. VOLTAGE TOLERANCE</th>
<th>MOTHERBOARD CAPACITIVE LOAD</th>
<th>MOTHERBOARD MAX. CURRENT (continuous)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Power Supply</td>
<td>+ 12 V</td>
<td>0 A</td>
<td>± 5 %</td>
<td>2.500 µF</td>
<td>26 A</td>
</tr>
<tr>
<td></td>
<td>- 12 V</td>
<td>0 A</td>
<td>± 10 %</td>
<td>-</td>
<td>0.3 A</td>
</tr>
<tr>
<td></td>
<td>+ 5 V</td>
<td>0 A</td>
<td>± 5 %</td>
<td>1.900 µF</td>
<td>6.0 A</td>
</tr>
<tr>
<td></td>
<td>+ 3.3 V</td>
<td>0 A</td>
<td>± 5 %</td>
<td>1.100 µF</td>
<td>0.5 A</td>
</tr>
<tr>
<td>Aux</td>
<td>+ 5 Vaux</td>
<td>0 A</td>
<td>± 5 %</td>
<td>1.900 µF</td>
<td>2.5 A</td>
</tr>
</tbody>
</table>

*) Max. motherboard input current incl. processor and DRAM memory. Additional power for drives, USB devices, PCIe cards etc. is not included!

Note: BIOS provides option to reduce CPU TDP/Turbo power in order to use PSU with limited loadability

Processor 125 W TDP: Max. Cont. Current = 26 A; max. Surge Current = 39 A (< 10ms)

Processor 65 W TDP: Max. Cont. Current = 23 A; max. Surge Current = 34 A (< 10ms)

Processor 35 W TDP: Max. Cont. Current = 11 A; max. Surge Current = 19 A (< 10ms)

### CONNECTOR / SOCKET DIAGRAM

Available connectors and sockets include:

- 12V for CPU (9-pin)
- USB 2.0
- M.2- 2230/2242/2280 Key-E SSD (PCIe Gen4)
- CPU FAN
- Battery
- ATX Power Supply
- 8 Bit GPIO
- Fan 4
- COM2, COM3, COM4
- 4 x DDR5-4800
- VRM Cooler
- M.2- 2230
- Front Audio SP/DIF
- PCIe x1 Gen3 (open slot)
- TPM Socket
- Front Panel
- 4 x SATA III
- 12V for CPU (8-pin)
- USB 3.2 Gen1
- USB 2.0
- USB 3.2 Gen2 Stick
- M.2- 2230
- M.2- 2230
- M.2- 2230
- 8 Bit GPIO
- 4 x DDR5-4800
- Battery
- Fan 4
- Fan 3
- Front Panel
- Power LED
- HDD LED
- Recovery BIOS, System and BIOS Password, Boot Sequence Control, Serial/USB- Port Access Protection, Write Protection for Flash BIOS, EraseDisk (BIOS Feature), Trusted Platform Module (TPM)
- Integrated PCIE incl. Hostlink
- Access to PCIe slots
- SSD (PCIe Gen4), "CPU"

+) Requires HW Rev. ≥ 02xx

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TECHNICAL INFORMATION

FEATURES

Board Size / Chipset
VGA* / DVI / DPP / UDS / eDP
Stereo Audio / 5.1 Multichannel Audio / Front Panel Audio
Buzzer / int. Speaker Support (mono)
Gigabit LAN / 2,5GigE LAN / Dual 2,5GigE LAN
Wol, LAN Boot / Teaming / TSN
Intel® Standard Manageability / AMT / vPro
SATA / SATA RAID / M.2 SSD (NVMe) / NVMe RAID
USB 2.0 / USB 3.2 Gen1 / USB 3.2 Gen2 / USB 3.2 Type-C
FAN controlled & monitored / CPU / AUX1 / AUX2 / AUX3
TEMP monitored CPU / Onboard Sensors / External Sensor

ARTICLE PART NO. DESCRIPTION
K3851-R ATX F5110-V194 Intel® 12th Gen Core™ Processor Series, Intel® R680E Chipset

SPECIAL FEATURES

Silent Fan / System Guard / cTDP
Recovery BIOS / Flash Update / Multi Boot
HDD Password / EraseDisk / TPM V2.0
BIOS POST Watchdog / BIOS Boot Watchdog / OS HW Watchdog
Logo Boot Option
High Efficiency Core Voltage Regulator Design
Operating Mode 24/7 / 8-5 (hrs per day - days per week)
Motherboard operating temperature range (chassis inside)

INTERNAL CONNECTORS

DIMM Sockets (DDR5-4800) / ECC-Support
PCI Express® x16: 16lanes-Gen5 / PCI Express® x16: 4lanes-Gen4
PCIe x8 8-4lanes: Gen4-“open” / Gen3-“closed”
PCI Express® x1: Gen3-“open”
PCI Slots (32 Bit, 33 MHz, Rev. 2.3) / Mini-PCle
SATA-600 / M.2 Key-M (NVMe SSD) / M.2 Key-B
M.2 2230 (Key-E, PCIe & USB2.0 for WLAN/Bluetooth)
S/PDIF (digital Audio) OUT / IN
Front Panel Audio (9-Pin, HD Audio)
USB 2.0 / USB 3.2 (Gen1) / USB 2.0 Stick / USB 3.2 (Gen2) Stick
Fan CPU / AUX1 / AUX2 / AUX3
Intrusion (Case Open) / GPIO (8Bit) / SM-Bus (Case Temp.)
Serial Port Header (COM, RS-232) / Parallel Port Header / PS2 Header
Front Panel (Power Switch, Reset Switch, LEDs, Intel 10 pin compatible)
Multirail PSU (24 pin + 8 pin) / Single 12 V PSU

EXTERNAL CONNECTORS

VGA Sub D* / DVI-I / DVI-D / DisplayPort V1.4a
Audio Mic. In / Line in / Line out (or driver configuration)
LAN (RJ-45)
PS/2 Mouse / Keyboard**
USB 2.0 / USB 3.2 (Gen1) / USB 3.2 (Gen2)
Serial (COM1, RS-232)
Parallel (EPP/ECP)

ARTICLE PART NO. DESCRIPTION
K3851-R ATX F5110-V194 Intel® 12th Gen Core™ Processor Series, Intel® R680E Chipset

ACCESSORIES

SERIAL PORT CABLE FS000-KO10 400 mm, fullsize slot bracket
M.2 CARRIER BOARD FS000-M001 D3352-A1

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